

Attachment 2

Protocol for Piloting the Design and Operation of Selective Noncatalytic Reduction (SNCR) on an Electric Arc Furnace

As required by this Consent Decree, Nucor will evaluate the use of Selective Noncatalytic Reduction (SNCR) to reduce Nitrogen Oxide (NOx) emissions from an electric arc furnace (EAF). This protocol sets forth the approach Nucor will use to evaluate the effectiveness of SNCR. Any provisions of this protocol, including schedule, may be modified by written agreement of the United States and Nucor at any time.

A. Approach for Norfolk Facility

Before initiating any testing program, Nucor will submit a detailed testing and monitoring plan to EPA for approval. The plan will include a description of the test methods to be used, a discussion of test procedures, and a description of sampling locations.

1. Feasibility Evaluation

Nucor and EPA will meet with SNCR vendors to determine the feasibility of installing and operating an SNCR system on the Norfolk twin shell furnace. Nucor will provide the vendors with information on the process and exhaust gas characteristics of the Norfolk EAF. Because Nucor has only limited information on the temperature profile of the exhaust gas, and this is a critical parameter in the design of an SNCR system; Nucor will develop a temperature profile for the EAF exhaust during this phase of the project. The temperature profile and other exhaust gas parameters and characteristics will be used by the vendor to develop a preliminary assessment of the estimated control efficiency for the SNCR system, an estimated value for ammonia slip, and the estimated cost of installing and operating the system. If Nucor and EPA agree, based on this preliminary assessment, that SNCR is a feasible technology for pilot installation and operation on an EAF, the vendor will provide a final design for the SNCR system.

2. Baseline Testing

Nucor shall use continuous emissions monitors (CEMS) to monitor and record Carbon Monoxide (CO), NOx, Sulfur Oxides (SOx), Oxygen (O2), Carbon Dioxide (CO2), ammonia, exhaust gas velocity, and temperature for a period of 30 days prior to

installing the SNCR system. Nucor will also periodically monitor the exhaust gas moisture content.

3. Evaluation of SNCR Performance

After the SNCR system is operational, Nucor will begin testing to determine the control efficiency achievable by SNCR. Nucor will use CEMS to monitor and record CO, CO₂, NO_x, O₂, Sox, velocity and temperature. Nucor will also periodically monitor the exhaust gas moisture content. Because the operation of a SNCR system has the potential to generate significant ammonia emissions, Nucor will also use a CEM to monitor ammonia during this performance evaluation period. If both EPA and Nucor agree that the data is representative or cannot be repeated on a comparative basis, the SNCR test will be considered complete.

4. Report to EPA

Nucor will prepare and submit to EPA a report that will include a discussion of the SNCR system design, any problems encountered during SNCR operation, the NO_x control efficiency of the SNCR system, the impact of the SNCR system on CO emissions, the impact of the SNCR system on ammonia emissions, and the cost effectiveness of the SNCR system based on the final capital cost of the system, the operating and maintenance costs of the system during testing, and the control efficiency of the system. Nucor will evaluate these factors in determining the success, as defined in the Consent Decree, of the SNCR pilot and include a recommendation as to whether a second pilot study should be conducted. Nucor will submit a copy of all electronic data to EPA with the report.

5. Schedule for Norfolk facility

Table 1 presents a schedule for the SNCR pilot study at the Norfolk facility.

TABLE 1. SCHEDULE FOR SNCR PILOT STUDY AT NORFOLK

ACTIVITY	PROJECTED DATA
Feasibility Evaluation	January 1 - March 15, 2001
Submit test plan	March 15, 2000
Baseline Testing	May 15, 2001

Evaluation Testing	November 15, 2001
Report to EPA	January 31, 2002

B. Second Pilot Study

If the SNCR system proves to be economically and technically feasible based on the results at the Norfolk facility, Nucor will select a second facility for piloting this technology. Prior to beginning the second pilot study, Nucor will provide EPA with a brief report that summarizes the rationale for selecting the second facility, presents an overview of the approach that will be used for implementing the pilot study, and presents a proposed schedule for the pilot.

Following completion of the second SNCR pilot study, Nucor will prepare and submit to EPA a report that will include a discussion of the SNCR system design, any problems encountered during the SNCR operation, the NOx control efficiency of the SNCR system, the impact of the SNCR system on CO emissions, the impact of the SNCR system on ammonia emissions, and the cost effectiveness of the SNCR system. The report will also include Nucor's recommendation concerning installation of the SNCR system at its remaining mills. This recommendation will be based on an evaluation of the success of the SNCR systems at the two pilot facilities. Nucor will also consider the economic and technical feasibility of installing SNCR on each of its remaining mills. One option is that Nucor will determine that SNCR may be economically and technically feasible at some of their remaining mills but not at others. Facility specific factors such as baseline emissions, temperature profiles, and ductwork configurations could impact the economic and technical feasibility at any given facility. If Nucor does not believe the SNCR pilot studies were successful, as defined by the consent decree, then the report will also include an evaluation of other potential alternatives for reducing NOx emissions at Nucor facilities.